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Review article

# Income and expenditure in private dental clinics in Japan

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**Summary** Although national dental care expenditure has not changed, the number of dental clinics has increased. Mass media has been reporting on the financial difficulties of dental clinics. To address this issue, we reviewed articles that showed the distribution and changes in net income, that is, total expenses subtracted from total income, of private dental clinics in Japan using data from a survey conducted by the Japan Dental Association. We also reviewed articles analyzing the factors relating to the net income. The results of the articles showed that distribution of net income has become positively skewed, with the mean dragged to the right by a few high scores. This means that the median is more appropriate than the mean as a measure of central tendency of net income. Factors relating to net income of private dental clinics have changed: private dental clinics that were opened after 1989 (new) and had dental hygienists, who may conduct dental maintenance, had high net income, suggesting that they are well-managed or having a different type of patient mix in recent years. These analyses provide important and useful information for not only better management of private dental clinics but also policy-making in dental health care.


**Contents**



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## 1. Introduction

Japan has been implementing a system of public health insurance for the whole nation since April, 1961 [1]. The insurance system covers not only medical treatment but also the majority of dental treatments, with the exception of some kinds of treatment such as orthodontic treatment and dental implants. Most dental clinics therefore conduct treatment based on public health insurance criteria.

Estimates of national medical care expenditure including dental treatment increased to 36.0 trillion yen in 2009 (Fig. 1) [2]. However, estimates of national dental care expenditure have not been changed, and the proportion of dental care expenditure in national medical care expenditure has decreased from about 9.8% (1992) to about 7.1% (2009). In addition, both the numbers of dentists and dental clinics have been increased (Fig. 2) [2]. The mean number of dental caries and percentage of people having dental caries has dramatically decreased in recent years in Japan (Fig. 3) [3]. Some magazines and newspapers have pointed out that some dental clinics have closed because of financial problem, and that some dentists are working poor, i.e. working people whose income falls below a given poverty line.

The Central Social Insurance Medical Council of the Ministry of Health, Labour and Welfare, Japan conducts a survey of dental clinic management every other year, and publishes the calculated mean values of the net income, that is, total expenses subtracted from total income, of dental clinics [4]. However, no detailed analyses including investigation of the distribution and change of net income, and factors relating to the net income, have been conducted. Analyses of income and expenses of dental clinics provide useful information for not only managing dental clinics but also policy making. The stability of financial aspects of managing dental clinics is the foundation for safe and appropriate dental treatment. For example, if a dental clinic has financial problems and tries to reduce expenses for medical safety, the number of medical accidents may increase. We reviewed articles that analyzed data from the survey on management of private dental clinics conducted by the Japan Dental Association, which is done every other year when the survey by the Central Social Insurance Medical Council is not conducted [5—7].

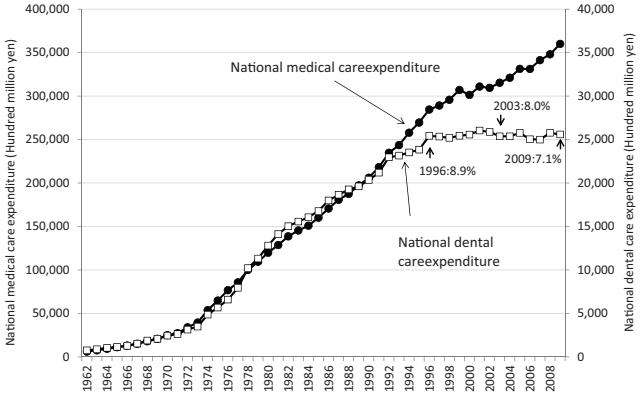


**Figure 1** Change in national medical care expenditure and national dental care expenditure. Year: proportion of dental care expenditure in national medical care expenditure.

## 2. Distribution of the net income of private dental clinics

The Japan Dental Association was established in 1903. Its membership excluding corporate members was 64,990 dentists in 2012, covering about 66% of dentists working in hospitals or clinics in Japan. About 85% of the dental clinics that are members of the Japan Dental Association are private and the rest are corporate. The authors used the data on private dental clinics in October, with a sampling rate of 0.10 in the articles [5—7].

Table 1 shows basic statistics on income and expenses of private dental clinics in Japan, including a detailed

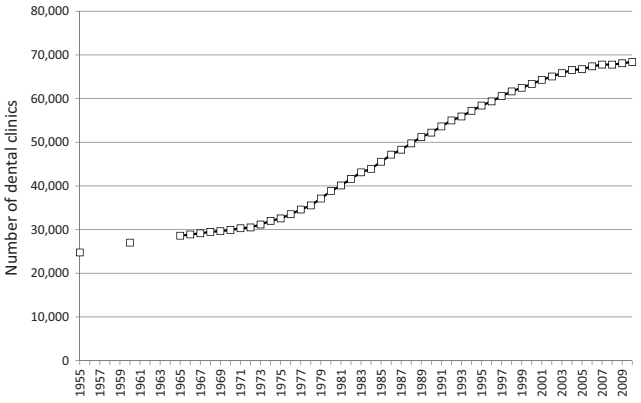


**Figure 2** Change in the number of dental clinics from 1955 to 2009.

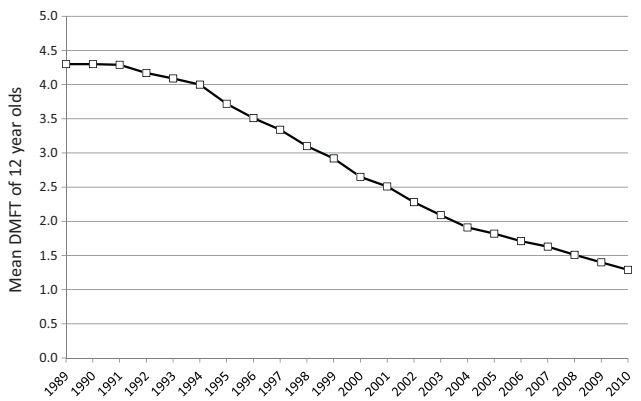


**Figure 3** Change in the mean DMFT of 12 year olds from 1989 to 2010.

**Table 1** Basic statistics of the net income of dental clinics in October 2006.

| | Mean | Standard deviation | Median | Minimum | Maximum |
|---|---|---|---|---|---|
| Age of owner (years) | 53.6 | 10.5 | 53 | 31 | 85 |
| Mean number of patients per day | 20.1 | 12.9 | 18.4 | 0.42 | 87.3 |
| Total income (yen) | 3,358,642 | 1,858,120 | 3,145,054 | 252,010 | 19,680,541 |
| Treatment covered by public health insurance | 2,895,002 | 1,485,694 | 2,746,760 | 0 | 10,852,180 |
| Treatment covered by workmen's compensation insurance and others | 11,468 | 232,468 | 0 | 0 | 7,183,000 |
| Other treatment | 405,365 | 777,990 | 137,890 | 0 | 10,922,510 |
| Other income | 44,878 | 231,615 | 9299 | 0 | 6,136,590 |
| Care covered by long-term care insurance | 1929 | 16,220 | 0 | 0 | 280,000 |
| Total expenses (yen) | 2,106,038 | 1,349,452 | 1,858,602 | 11,010 | 12,462,529 |
| Salary for employees | 893,312 | 661,637 | 755,912 | 0 | 5,262,777 |
| Medicine | 42,553 | 87,855 | 20,210 | 0 | 1,686,000 |
| Dental materials | 208,760 | 217,108 | 151,558 | 0 | 2,500,800 |
| Commissions | 368,007 | 357,835 | 301,792 | 0 | 5,471,997 |
| (commissions for dental technicians) | 331,772 | 300,900 | 276,400 | 0 | 4,790,165 |
| Depreciation costs | 143,724 | 176,121 | 94,016 | 0 | 1,722,000 |
| Other expenses | 449,681 | 447,598 | 356,716 | 0 | 3,849,364 |
| Net income (yen) | 1,252,605 | 900,765 | 1,072,101 | −1,069,460 | 7,218,012 |

Net income: total expenses subtracted from total income. 1 US$ = 118 Japanese yen (October, 2006).

breakdown [5]. The mean age of the owner was 53.6 years. The mean number of patients per day was 20.1 people with a minimum of 0.42 people and maximum of 87.3 people. Net income in October, 2006 ranged from −1,069,460 to 7,218,012 yen, and the mean, median and standard deviation of net income were 1,252,605, 1,072,101, and 900,765 yen, respectively.

Fig. 4 shows histograms of the net income of private dental clinics in October, 1996 and October, 2006 [6]. In 1996, the histogram was similar to a normal distribution, but, in 2006, the distribution was positively skewed, with the mean dragged to the right by a few high scores. The distribution between dental clinics with a low net income and those with a high net income widened from 1996 to 2006, as seen by the increase in size of the coefficient of variation, calculated by dividing standard deviation with mean, from 65.7% in 1996 to 71.9% in 2006. The Central Social Insurance Medical Council always uses means as a measure of central tendency of net income. However, because the distribution in 2006 was not normally distributed, the median (1,072,101 yen) may be more appropriate than the mean (1,252,605 yen) as a measure of central tendency of net income. It is noteworthy that by using the mean as a measure of central tendency in 2006, net income was over-estimated by about

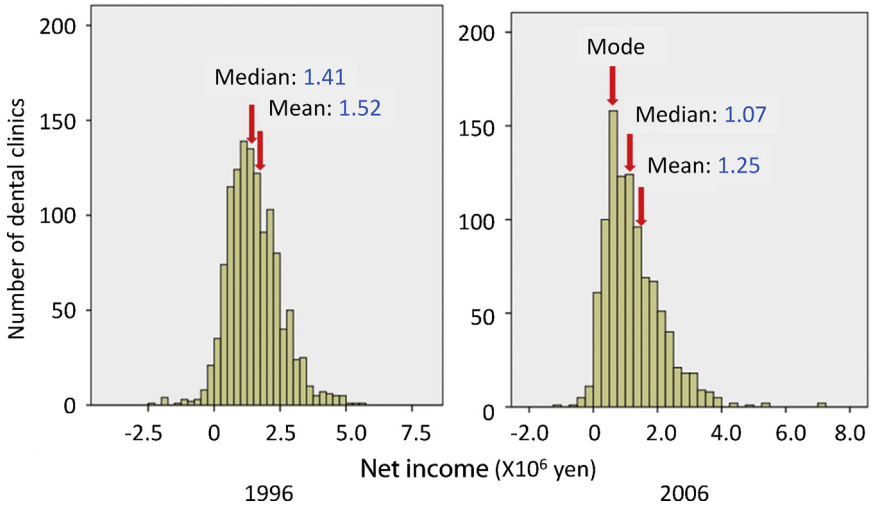


**Figure 4** Histograms of the net income of dental clinics in October 1996 and October 2006. Net income: total expenses subtracted from total income.

**Table 2** Factors associated with whether or not the net income of dental clinics exceeded the median in 1996 and 2006 (multiple logistic regression models).

| 1996 | | 2006 | |
|---|---|---|---|
| Independent variables | Odds ratio | Independent variables | Odds ratio |
| Number of full-time dental technicians | 1.477 | Ratio of expenses for medicine to total expenses | 1.068 |
| Number of full-time dental hygienists | 1.323 | Ratio of expenses for commissions for dental technicians to total expenses | 1.056 |
| Ratio of expenses for medicine to total expenses | 1.045 | Mean number of patients per day | 1.054 |
| Ratio of expenses for commissions for dental technicians to total expenses | 1.044 | Ratio of expenses for salaries for employees to total expenses | 1.035 |
| Mean number of patients per day | 1.034 | Ratio of dental materials to total expenses | 1.040 |
| Ratio of expenses for salaries for employees to total expenses | 1.024 | Ratio of income from treatment covered by public health insurance to total income | 0.973 |
| Ratio of other income to total income | 1.016 | Age of owner | 0.964 |

Net income: total expenses subtracted from total income. The dependent variable in the model takes the value of 1 if the net income is more than median and 0 if the net income is equal or less than median.
Variables removed from the multiple logistic regression model because the *p*-value was greater than 0.10 (1996): number of other full-time employees, mean number of patients per day, ratio of income from treatment covered by public health insurance to total income, ratio of other income to total income, ratio of depreciation costs to total expenses.
Variables removed from the multiple logistic regression model because the *p*-value was greater than 0.10 (2006): numbers of full-time dental hygienists, full-time clerks, and other employees, number of home dental care patients, ratio of other income to total income, ratio of other income to total income.

17%. This over-estimation could reduce dental treatment fees in public health insurance at the meeting of the Central Social Insurance Medical Council, and could result in reduction of the net income of dental clinics in Japan.

It is also important to note that the data used by the Central Social Insurance Medical Council was based on the month of June. June usually has the largest number of patients because dental examinations in schools (and some companies) are conducted from April to June every year. The data used by the Central Social Insurance Medical Council is therefore an over-estimate, and the use of the data on only June may inappropriately affect management of dental clinics in Japan.

## 3. Factors relating to net income of private dental clinics

### 3.1. Whether or not the net income exceeds the median [6]

Table 2 shows factors relating to whether or not the net income of private dental clinics exceeds the median in 1996

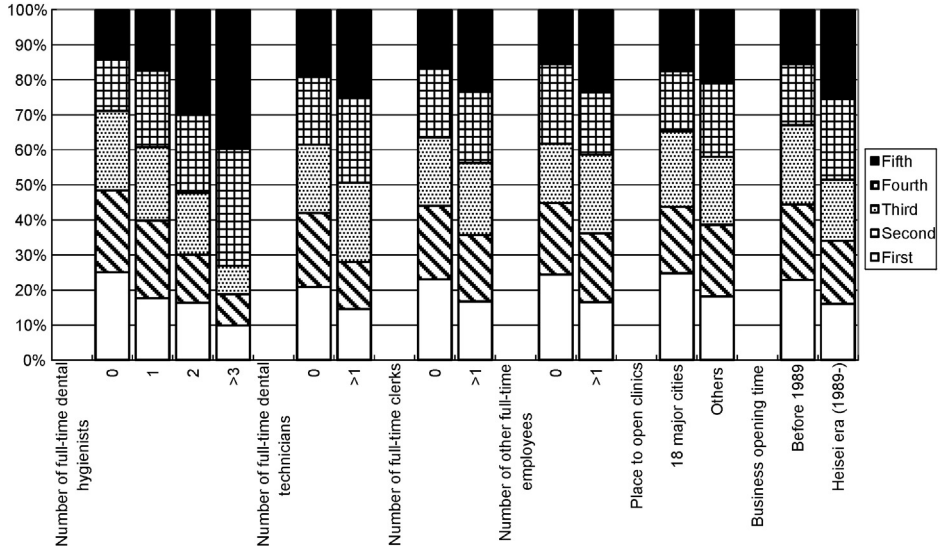


**Figure 5** Association between the quintiles of the net income of dental clinics and the number of employees, place and business opening time using data from October 2008. Net income: total expenses subtracted from total income. First: the lowest net income, Fifth: the highest net income.

and 2006 using multiple logistic regression models. The dependent variable in the model takes the value of 1 if the net income is more than median and 0 if the net income is equal or less than median. The independent variables were included in the regression if the standard error of the estimated coefficient for the variables yielded a type I error probability of 5% or less. The number (quantity) of clinic staff members was positively associated with net income in 1996. However, in 2006, the number of staff members was no longer associated with net income. Instead, net income was associated with the types of services provided or the source of payment for those services. These results suggest that financial retrenchment has occurred in private dental clinics in the recent years.

### 3.2. Comparison among quintiles of net income [7]

Using data from a survey on the management of private dental clinics in October, 2008, 1240 private dental clinics were categorized into quintiles according to net income. The higher quintiles (having higher net income) had younger owners (dentists) and larger median values of the number of patients per month. The number of full-time dental hygienists increased with the level of quintile (Fig. 5). Private dental clinics established after 1989 were more frequently categorized into the highest or second highest quintile compared to those established before 1989. Moreover, the proportion of income from treatments not covered by health insurance in the total income gradually increased from the lowest quintile (4.1%) to the highest quintile (8.5%).

These results suggest that private dental clinics opened after 1989 (new), and having dental hygienists (dental hygienists may conduct dental maintenance) had a large net income, suggesting that they may be better managed, they may have a different case-mix of care, or they may have different sources of revenue. Prevalence of dental caries has decreased, while that of periodontal disease has remained increasing [8]. Moreover, the number of private dental clinics has been increasing. Therefore, dental treatment needs may have shifted from dental caries to periodontal disease. As young dentists may have received new information, especially on periodontology, they employ dental hygienists, run a system of supportive periodontal treatment in their clinics, and consequently, have large net income. Analyses using data from the Central Social Insurance Medical Council also showed that dental clinics with more dental hygienists made higher profits [9]. A similar association between employing dental hygienists and income of dentists has also been reported in the United States [10,11]. Moreover, as young dentists have knowledge of dental implants, they treat patients using dental implants, which is not covered by public health insurance and brings in a large net income.

## 4. Transitions in net income of private dental clinics

Fig. 6 shows changes in the net income as well as total expenses of private dental clinics from 1996 to 2010, based on surveys conducted by the Japan Dental Association [5,7,12]. Net income decreased from 1996 to 2004 with the lowest net income in 2004, after which point the value gradually increased until 2008. The change (decrease) from 2006 to 2010 was less than that of dentists' net income in the United States [13]. The United States suffered an economic crisis during that period that also affected the Japanese economy. As the economic crisis in the US was more critical than in Japan, its influence on dental health care may be more severe in the US than in Japan. In addition, Japanese people usually use public health insurance for dental health care, while people in the US usually use private health insurance, so the extent of the effects of the economic crisis on patient visitation to dental clinics may be stronger in the US than in Japan. Further research is needed to clarify this issue.

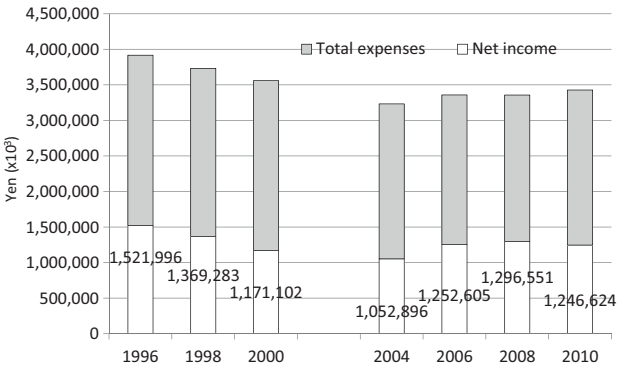


**Figure 6** Change in the median of the total expenses and the net income of dental clinics from 1996 to 2010. Net income: total expenses subtracted from total income.

## 5. Conclusions

We reviewed articles that analyzed distribution, changes and factors relating to the net income of private dental clinics in Japan and obtained the following results:

(1) The distribution of net income became positively skewed, with the mean dragged to the right by a few high scores. The median is thus more appropriate than the mean as a measure of central tendency of net income.
(2) Factors affecting the net income of private dental clinics have changed. Private dental clinics that opened after 1989 (new) and have dental hygienists (dental hygienists may conduct dental maintenance) had large net income, and appeared to be better managed, or to have a different type of patient mix in recent years.

These results show the importance of analyzing management of private dental clinics from the viewpoint of policy-making. The results of the studies indicate that it would be more effective for Japanese government to emphasize continuing education for older dentists regarding dental maintenance in the dental health insurance system, in order to alleviate the financial problems of Japanese dentists and establish a better dental health care system in Japan.

## Conflict of interest statement

We declare no conflict of interest.

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